

Flexible Transpiration Cooled Thermal Protection System for Inflatable Atmospheric Capture and Entry Systems, Phase II

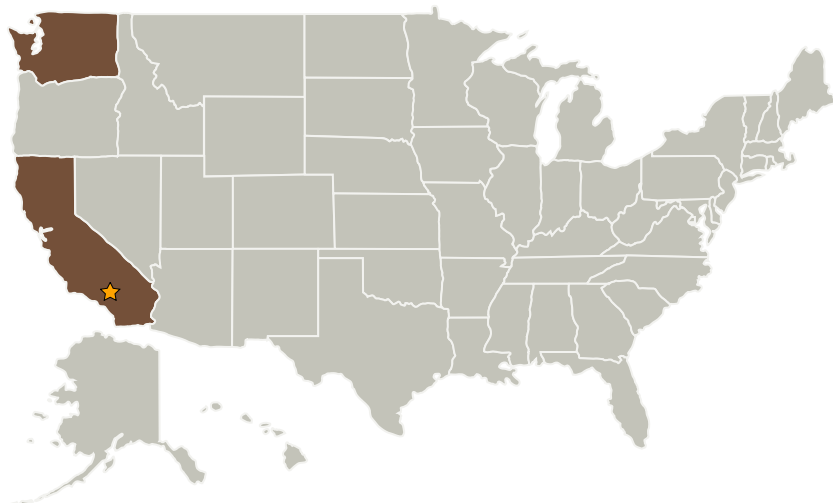
Completed Technology Project (2007 - 2008)



Project Introduction

Andrews Space, Inc. proposes an innovative transpiration cooled aerobrace TPS design that is thermally protective, structurally flexible, and lightweight. This innovative design will meet launch volume constraints and satisfy terminal aerobraking requirements. The approach will focus on transpiration cooling of a flexible material and employs preceramic polymers and active filler technologies as key features of the TPS design. The major hurdle to inflatable aerobrakes becoming reality is the development of a lightweight and structurally flexible TPS. Alternative designs have focused on complex multilayering to increase the effective emissivity of the material, whereas Andrews Space will focus on reducing the thickness, thus decreasing the overall system mass. By combining well understood materials with an innovative, flexible, transpiration cooled TPS, a realizable inflatable aerobrace system has been developed which shows up to 56% mass savings over traditional, rigid aeroshells and 23% over other leading designs.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Andrews Space, Inc.	Supporting Organization	Industry	Tukwila, Washington

Primary U.S. Work Locations	
California	Washington

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.3 Thermal Protection Components and Systems
 - └ TX14.3.1 Thermal Protection Materials